

PROCEEDINGS  
OF THE  
NEW ENGLAND ZOÖLOGICAL CLUB

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NOTES ON AMPHIBIA AND REPTILIA FROM  
EASTERN ASIA.

BY THOMAS BARBOUR.

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WHILE the writer was in Yokohama, selections were made from the stock of Mr. Alan Owston. The material embraced marine invertebrates, fishes, reptiles, etc., in considerable variety. The present list contains the species of amphibians and reptiles from Japan proper, the Riu Kiuian groups, Formosa, Hainan and a few other scattered localities. On my arrival home, in 1907, I found Dr. Stejneger's splendid Herpetology of Japan<sup>1</sup> awaiting me. It has covered the field of these collections very completely; nevertheless it seems worth while to put this material on record that future students may know where it can be consulted.<sup>2</sup> A few of the species were either new or hitherto unrecorded from the localities represented, so that their publication was evidently desirable.

For convenience of reference the original descriptions of *Bufo bankorensis*, *Microhyla hainanensis*, *Rana subaspera*, *Goniosaurus hainanensis*, *Natrix arquifasciata*, *Pseudoxenodon stejnegeri* and *Holarchus nesiotis*, are repeated here.

It is a great pleasure to thank Dr. Stejneger for the kindly way in which he has so often aided me.

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<sup>1</sup> Bulletin 58 of the United States National Museum, Washington, D. C., 1907.

<sup>2</sup> Except where otherwise stated, all the specimens mentioned in this paper are in the Museum of Comparative Zoölogy, Cambridge.

**Tylototriton andersoni** Boulenger.

Boulenger, Ann. Mag. N. H., (6), Vol. X, 1892, p. 304.  
Stejneger, Herp. of Japan, 1907, pp. 12-14.

It is interesting to record the finding of two additional specimens of this hitherto very rare newt. Both agree perfectly with Stejneger's description of the example in the Imperial College of Science at Tokyo. Both of these two before me came from Nago, Okinawa shima, Riu Kiu Islands. From this same island came both the type and the specimen in Tokyo.

**Diemictylus pyrrhogaster** (Boie).

Boie, Isis, 1826, p. 215.  
Stejneger, Herp. of Japan, 1907, pp. 16-21.

This common species is here represented by six examples from a pond on Mt. Fuji, Hondo, Japan, Owston collection, and thirty-two specimens from Kanagawa and Tokyo. (Mus. Comp. Zoöl., 1607, 1865, 1915, Gulick collector).

**Diemictylus ensicauda** (Hallowell).

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 494.  
Stejneger, Herp. of Japan, 1907, pp. 21-24.

Five specimens from Nago, Okinawa shima, Riu Kius, Owston collection.

**Onychodactylus japonicus** (Houttuyn).

Houttuyn, Verh. Genoot. Wet. Vlissingen, Vol. IX, 1782, p. 329, pl. facing p. 336, fig. 3.  
Stejneger, Herp. of Japan, 1907, pp. 42-46.

Four adults from Hakone Lake, Hondo, and eighteen larvæ from the same locality, Owston collection. There is a specimen from Tokyo, Mus. Comp. Zoöl., no. 1864.

***Salamandrella keyserlingii* Dybowski.**

Dybowski, Verh. Zool.-Bot. Ges. Wien, XX, 1870, p. 237.

Stejneger, Herp. of Japan, 1907, pp. 37-42.

It may be worth while to record that there are two topotypes of this species from Lake Baikal, in the Museum of Comparative Zoölogy (M. C. Z., no. 1288).

***Bufo bankorensis* Barbour.**

## Plate VI.

Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, p. 323.

Habit very similar to *B. himalayanus* (Günther) and *B. melanostictus* Schneider. It differs markedly from the former in the smoother crown, in that the warts on the upper surfaces of the body, and especially on the legs, are much smaller, more scattered, and subequal. It differs conspicuously from the second mentioned species in the absence of the cephalic ridges.

Crown deeply concave, smooth; ridges between eye and nostril very weak; snout short and blunt; interorbital space much wider than upper eyelid; tympanum small, vertically oval, partially covered by a fold of skin. First finger a very little longer than second; a small inner and an outer palmar tubercle, which is nearly three times as large as the inner one; subarticular tubercles single, rather prominent. There are many other tubercles on palm and digits. The hind limb being carried forward, the tarso-metatarsal articulation reaches beyond the tip of the snout; toes less than half webbed, the webs with their outer edges denticulate; small, single, subarticular tubercles on all but fourth toe, where they are double; two subequal metatarsal tubercles, the inner the more prominent; lower surfaces of feet richly tuberculate like the hands. A slightly developed tarsal fold, more conspicuous in the male than in the female. Upper surfaces with subequal warts well separated by areas of smooth skin; in the female specimen the warts show a tendency toward spinosity. The parotoid glands are large, suboval, or tending toward kidney shape. I do not find an internal vocal sac in the male; in this particular especially is the tendency toward *B. himalayanus*. In the specimen of this sex nuptial asperities are present on the first and second finger.

Color (in alcohol) dark brown above, lighter below; a blackish band behind at posterior border of eye, covers the lower half of the parotoid gland,

and runs along the side, ending in a series of spots. In the female many of the warts have black apices, a character frequent in *B. melanostictus*.

*Types*,— no. 2432, Mus. Comp. Zoöl., two specimens, male and female, Bankoro, central Formosa. Taken by a Japanese collector of Mr. Alan Owston.

This strongly marked species is evidently closely related to *Bufo melanostictus*; it also tends toward *Bufo himalayanus*. This opinion is also held by Dr. Stejneger, who has most kindly examined the types.

### **Bufo formosus** Boulenger.

Boulenger, P. Z. S. Lond., 1883, p. 140, pl. XXIII.  
Stejneger, Herp. of Japan, 1907, pp. 60-64.

A single topotype, Yokohama, Japan, from Owston.

This form is definitely known only from the vicinity of the type locality, Yokohama, Hondo, Japan.

There are two large specimens in the Museum of Comparative Zoölogy (M. C. Z., no. 309), which were taken many years ago at Kanagawa.

### **Bufo bufo asiaticus** (Steindachner).

Steindachner, Novara Exp., Zool., I, Amphib., p. 39.  
Stejneger, Herp. of Japan, 1907, pp. 66-69.

One specimen, marked 'North China' (M. C. Z., no. 1904). This specimen differs considerably from Stejneger's diagram in that the tympanum is less than one fourth the diameter of the eye. The parotoid gland is considerably shorter, for in the figure it equals in length its distance from the tip of the snout, while in this specimen its length only equals that to the nostril. This probably is only an aberrant individual, and unfortunately the locality record is provokingly vague.

Type locality: Shanghai.

It is known from Eastern Mongolia, Amurland, Korea and northeastern China. Stejneger remarks further that south of the

type locality it is replaced by *Bufo bufo gargarizans*. This is one of the many unfortunate instances where the type locality has not turned out to be in the central part of a form's range.

***Hyla arborea japonica* Günther.**

Günther, Cat. Batr. Sal., 1858, p. 109.  
Stejneger, Herp. of Japan, 1907, pp. 76-82.

Four examples from Mt. Fuji, Japan. This species was extremely abundant during July, 1907, on the trees of the grove about Daibutsu, at Kamakura, and also locally in the hills about Lake Chusenji.

***Cacopoides borealis* (Barbour).**

Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, p. 321.

Material of *Callula verrucosa* Boulenger from the type locality shows that I was incorrect in considering *C. borealis* synonymous with Boulenger's engystomatid from Yunnan. (Cf. Barbour, Proc. Biol. Soc. Wash., Vol. XXII, p. 89, 1909.) A paper comparing the characters of these two genera is in process of publication.

***Microhyla hainanensis* Barbour.**

Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, pp. 322-323.

Habit stout. Snout rather rounded, longer than orbital diameter; interorbital space about equal to upper eyelid. Fingers moderate; first much shorter than second; fourth much the longest; toes moderate, nearly one half webbed; tips of fingers and toes not dilated; subarticular tubercles present, inconspicuous on fingers but very pronounced beneath the toes; two palmar tubercles, the outer by far the larger; two small metatarsal tubercles, the outer the more prominent. The hind limb being carried

forward along the body, the tibio-tarsal articulation reaches to or beyond the tip of the snout. Skin mostly smooth, with a few scattered tubercles on the posterior part of the back and a larger number on the outer sides of the thighs.

Color olive or pinkish brown in various shades: several chevron-like bands of a darker tone on the back; a dark band between the eyes, which may be interrupted on the median line; a dark band along each side and many cross-bars on the limbs; a large, very dark brown — almost black — spot on each side of the vent. Throat and sides of chest clouded with dusky brown; the remainder of the lower parts immaculate. Male with a subgular vocal sac.

*Types*, no. 2435, Mus. Comp. Zoöl., four specimens from Mt. Wuchi, central Hainan. Taken by a Japanese collector of Mr. Allan Owston.

This form is evidently a near relative of *M. pulchra* (Hallowell), but is easily distinguished by the stout form of body and hind limbs, the scattered tubercles, and the conspicuous black spots.

#### ***Microhyla okinavensis* Stejneger.**

Stejneger, Proc. Biol. Soc. Wash., Vol. XIV, 1901, p. 189; Herp. of Japan, 1907, pp. 89-92.

Six specimens from Ishigaki shima, Yaeyama group, Riu Kius, Owston collection; and two obtained from Dr. Stejneger in exchange.

#### ***Rana subaspera* Barbour.**

Barbour, Proc. Biol. Soc. Wash., Vol. XXI, 1908, pp. 189-190.

This species is one of the largest of frogs, being the size of a fully adult *Rana catesbiana*.

The single specimen was sent to Dr. Stejneger for examination. His letter, confirming the surmise that it was undescribed, said: "It is \* \* \* probably nearest related to *Rana feæ*, and also to *Rana liebighii* and *Rana boulengeri*." He then calls attention to the enormously developed first metacarpal, "somewhat recalling

that of *R. holsti*, with which species, however, the present one has nothing to do." He adds: "The large gland above the axil is also very remarkable."

*Description.*—Vomerine teeth in two small oblique groups, situated very slightly behind the choanae. The distance between these is a little less than their distance from the choanae. Habit rather stout. Head much broader than long; snout very short, well rounded; no canthus rostralis; nostril much nearer tip of snout than eye; interorbital space narrower than upper eyelid; tympanum distinct, three fourths the diameter of the eye. Fingers moderate, first much longer than second; first metacarpal very greatly developed (similar to *R. holsti*); toes rather long, entirely webbed; subarticular tubercles well developed; tips of fingers and toes slightly dilated; inner metatarsal tubercle narrow and elongate, two thirds the length of the inner toe; outer metatarsal tubercle indistinct; no inner tarsal fold. The tibio-tarsal articulation reaches the eye; tibia one half the length of the body.

Body warty, all upper parts and sides of body and limbs with many round, prominent warts. No fold from eye to shoulder as in *R. feæ*. A large kidney-shaped gland above each axil. Uniform olive brown on all upper surfaces and sides; tympanum lighter; under surfaces chestnut brown with olive marblings. Male without internal vocal sacs. The type, a male, evidently taken in the breeding season, has light-colored spine-like asperities on the two inner fingers; there are, as in *R. liebigii*, asperities on the inner side of the arms and, unlike that frog, these are plentifully sprinkled over the entire chest and throat region to the very edges of the lips.

*Type*, no. 2440 of the amphibian collection in the Museum of Comparative Zoölogy. Taken in the Riu Kiu Islands, May, 1904, by a Japanese collector of Mr. Alan Owston.

### ***Rana amurensis* Boulenger.**

Boulenger, Bull. Soc. Zool. France, 1886, p. 598.

Stejneger, Herp. of Japan, 1907, pp. 119-121.

In the Owston collection are two adults and six young specimens of this rather rare species. They were collected in the West Taipai-shiang district of northern China. The reader is referred to Stejneger (*l. c.*) for a detailed account of this form's habitat.

**Rana nigromaculata** Hallowell.

Hallowell, Proc. Acad. Nat. Sci. Phila. 1860, p. 500.  
Stejneger, Herp. of Japan, 1907, pp. 94-100.

There are specimens of this species in the Museum of Comparative Zoölogy from Peking, China (M. C. Z., no. 1701), and also from Kanagawa, Japan (M. C. Z., 1611). These latter are the types of Cope's *Tomopterna porosa*. In the Owston collection was a very large specimen from Antung, Manchuria. This was with the new genus *Cacopoides*; but as the species is widely spread in eastern Asia, this is not conclusive proof that the new genus must have come from Manchuria. *Rana nigromaculata* is, however, very characteristic of this locality.

**Rana temporaria** Linné.

Linné, Syst. Nat., 1758, I, p. 212.  
Stejneger, Herp. of Japan, 1907, pp. 113-116.

Two specimens from Yezo (Hokkaido), Japan. A third specimen in the bottle differs considerably from these two. It is, I think, almost surely a young *R. japonica*. Stejneger's work shows that the Yezo records for this species "need confirmation." This frog is too young to identify with certainty, but it seems very likely that both the above species do occur on this island.

**Polypedates viridis** Hallowell.

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 500.  
Stejneger, Herp. of Japan, 1907, pp. 147-149.

A single example from the type locality, Okinawa shima, Riu Kiu Archipelago, Owston collection. With no examples of *P. schlegelii* at hand, I cannot verify the questions regarding the dissimilarity of these two species, which Stejneger has raised.

This species is reported common on this one group, to which it seems to be confined.



**Polypedates owstoni** Stejneger.

Stejneger, Herp. of Japan, 1907, pp. 149-150.

A single specimen from the type locality, the only one from which this species is so far known, Ishigaki shima, Yaeyama Island, of the southern Riu Kiu Archipelago, Owston collection.

**Gekko japonicus** Duméril & Bibron.

Duméril et Bibron, Erp. Gén., III, 1836, p. 337.

Stejneger, Herp. of Japan, 1907, pp. 165-169, pl. XIII.

An example from Kanagawa, Japan.

**Gekko swinhonis** Günther.

Günther, Rept. Brit., 1864, p. 104, pl. XII, fig. A.

Boulenger, Cat. Liz. Br. Mus., I, 1885, p. 189.

Dr. Boulenger says that this form may be distinguished from the preceding by the few dorsal tubercles, the small, separated, inner pair of chin shields, and the lack of webbing between the toes. Five specimens from Sian, Shensi, China, substantiate the validity of the two characters first mentioned; but, as for the feet, I cannot see that these differ from those of the Japanese specimen.

Sian or Singan is in the southern part of Shensi, of which province it is the capital. It is about six hundred miles southwest of Peking, the type locality of this species, and whence all the previously recorded specimens have come.

**Goniurosaurus hainanensis** Barbour.

Pl. VII, fig. 7.

Barbour, Bull. Mus. Comp. Zool., Vol. 51, 1908, p. 316.

Habit slender. Head depressed, subtriangular, distinct from neck;

snout pointed, distance from anterior border of eye to tip of snout equal to distance from posterior border of eye to ear opening; ear opening a small, narrow, almost vertical slit. Body long, somewhat depressed. Limbs rather long, thin. Scales of top of head, body, limbs, and tail small, uniform flat granules, of varying shapes; among these on the back more or less regular longitudinal series of enlarged tubercular scales occur; these are also scattered over the upper surfaces of the limbs and are present on the proximal half of the tail in twelve whorls, which are not complete below. Scales of all the lower surfaces larger than the contour scales of the upper surfaces, polygonal, subequal. Male with twenty-nine preanal pores in an angular series. Rostral scale one and one half times as broad as high; separated from the nostril by two enlarged superposed scales, the anterior nasals; the nostril lies behind these, and is surrounded elsewhere by small scales; it is not in contact with a supralabial. There are no other enlarged scales except the supralabials, ten in number, and a few enlarged granules on top of the nose. Mental large, an imperfect equilateral triangle. Tail long, slender, a little shorter than the distance from vent to tip of nose.

Color very dark brown, almost black; limbs brown, belly white. A white band reaching around the back of the head from eye to eye; a white band across body near the fore limbs, one across the middle of the body and one across the body near the hind limbs. Three white rings around the tail, which is almost black above and below. The extreme tip of the tail is white.

*Type*,— no. 7104, Mus. Comp. Zoöl., a single specimen, taken 16 November, 1906, on Mt. Wuchi, central Hainan, by a Japanese collector of Mr. Alan Owston.

### **Hemidactylus bowringii** (Gray).

Gray, Cat. Liz. Br. Mus. 1845, p. 156.

Stejneger, Herp. of Japan, 1907, pp. 176-178.

Two from Formosa.

### **Calotes versicolor** (Daudin).

Daudin, Rept., III, 1802, p. 395, pl. 54.

Boulenger, Cat. Liz. Br. Mus., I, 1885, pp. 321-322.

A single adult male specimen, typical in all respects except that the gular scales are more than "feebly keeled." From Mt. Wuchi, Hainan.

**Japalura swinhonis** Günther.

Günther, Rept. Brit. Ind., 1864, p. 133, pl. XIV, fig. B.  
Stejneger, Herp. of Japan, 1907, pp. 184-188.

Two typical examples from Bankoro, central Formosa.

**Japalura polygonata** (Hallowell).

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 490.

Six examples from localities as follows: one each from Okinawa shima and Amami Oshima and four from Ishigaki shima, Riu Kiu Islands.

**Draco whiteheadi** Boulenger.

Boulenger, P. Z. S. Lond., 1899, pp. 956-957, pl. LXVI, fig. 1.

It was a great pleasure to find two examples of this species hitherto known only from the type. They are an adult male, agreeing well with Boulenger's excellent figure, and a young specimen, both from Mt. Wuchi, in the interior of Hainan.

**Eumeces latiscutatus** (Hallowell).

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 496.  
Stejneger, Herp. of Japan, 1907, pp. 195-200.

In the collection are two specimens of this common Japanese species from Yokohama.

**Eumeces marginatus** (Hallowell).

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 492.  
Stejneger, Herp. of Japan, 1907, pp. 205-208.

Three topotypes from Okinawa shima, Riu Kiu Islands.

**Eumeces kishinouyei** Stejneger.

Stejneger, Proc. Biol. Soc. Wash., Vol. XIV, Dec. 12, 1901, p. 190;  
Herp. of Japan, 1907, pp. 210-213.

A fine example from Ishigaki shima, Yaeyama group, Riu Kiu Islands.

**Mabuya longicaudata** (Hallowell).

Hallowell, Trans. Amer. Phil. Soc., (2), Vol. XI, 1856, p. 77, pl. IV,  
fig. 1.

Stejneger, Herp. of Japan, 1907, pp. 214-216, pl. XVI.

In the Owston collection was an adult specimen of this species from Mt. Wuchi, Hainan, and the Museum of Comparative Zoölogy has another, taken by the author near Saigon, Anam. These two specimens agree perfectly with one another, and with plate XVI in Stejneger's book, taken from Fischer (Abh. Nat. Ver. Hamb., IX, 6, pl. 1), except in one particular. They have three strong keels on each scale; on a few scales the Saigon example has four. Fischer's figure shows only two, but Hallowell's shows three, albeit somewhat indistinctly. This may not be a character of any value; certainly it does not separate specimens from Hainan and Cochin China. We must remember, however, that Fischer's figure was taken from the type of his *Euprepes ruhstrati*, and this came from South Formosa. I suspect that this may prove to be a valid species.

**Sphenomorphus indicus** (Gray).

Gray, Ann. Mag. N. H., (2), Vol. XII, 1853, p. 388.

Stejneger, Herp. of Japan, 1907, pp. 216-218, pl. XVII.

Two examples of this species from Bankoro, central Formosa. Only once previously taken in Formosa.

**Lygosoma smaragdinum** (Lesson).

Lesson, Voy. Coquille, Zool., II, 1830, p. 43, Reptiles pl. III, fig. 1.  
Boulenger, Cat. Liz. Br. Mus., III, 1887, p. 250.

Dr. Stejneger, "after a very detailed comparison," identifies a small scinc as the young of this species. It has not been reported from Formosa previously. This example is from Bankoro in the central part of the island.

**Lygosaurus pellopleurus** Hallowell.

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 496.  
Stejneger, Herp. of Japan, 1907, pp. 222-224.

A single specimen, said to have come from Awa, Shikoku, Japan, but doubtless incorrectly labelled, for the species is confined to the upper and middle groups of the Riu Kiu Islands.

**Cryptoblepharus boutonii nigropunctatus** (Hallowell).

Hallowell, Proc. Acad. Nat. Sci., Phila., 1860, p. 489.  
Stejneger, Herp. of Japan, 1907, pp. 225-228.

Three specimens from Haha shima, Bonin Islands.

**Takydromus smaragdinus** Boulenger.

Boulenger, Cat. Liz. Br. Mus. III, 1887, p. 509.  
Stejneger, Herp. of Japan, 1907, pp. 236-238.

Two examples from Okinawa shima, Riu Kiu Islands.

**Takydromus tachydromoides** (Schlegel).

Schlegel, Fauna Jap. Rept., 1838, pp. 101, 139.  
Stejneger, Herp. of Japan, 1907, pp. 238-245, pl. XVIII.

Two from Mt. Fuji, Japan.

***Natrix vibakari* (Boie).**

Boie, Isis, 1827, p. 207.

Stejneger, Herp. of Japan, 1907, pp. 266-271.

A single half-grown example of this common species agrees well with Stejneger's description of a specimen from Yokohama. It was taken at Hiuga, Kiusiu, Japan.

***Natrix tigrina* (Boie).**

Boie, Isis, 1826, p. 205.

Stejneger, Herp. of Japan, 1907, pp. 272-277.

Three specimens, two young and one half-grown, from Yokohama, add nothing to our knowledge of this species. There is no irregularity of the pre- or postocular scales in any of these.

***Natrix æquifasciata* Barbour.**

Pl. VII, figs. 1-4.

• Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, p. 317.

Eye rather large. Rostral broader than deep, just visible from above; internasals almost wedge-shaped, twice as long as broad, one and one half times as long as prefrontals; frontal once and two thirds as long as broad, as long as distance from end of the snout, shorter than the parietals; loreal as long as deep; two preoculars and two or three postoculars; one or two suboculars may be present,— these are very small and separated by the fifth upper labial. Temporals 2 + 3, — these may be broken into several scales; nine upper labials, the seventh largest, and the fifth always entering orbit,— the fourth and sixth may do so also, or they may be excluded by the suboculars; five pairs of lower labials in contact with anterior chin shields, which are a very little shorter than the posterior. Scales in nineteen rows, strongly keeled, except the outer row, on which the carination is weak. Ventrals 148-151; anal divided; subcaudals 74-75.

Color (in alcohol): Boldly banded with twenty or twenty-one black bars on the body and twelve on the tail. The interspaces narrower than the

bars, but less narrow laterally than dorsally, white with a slight brownish tinge. Ventral surface ivory white, with black markings of the bars; these often end abruptly at the median line. The black blotches are roughly alternate.

*Types*, no. 7101, Mus. Comp. Zoöl., two specimens, each about 20 cm. long, from Mt. Wuchi, central Hainan. Taken by one of Mr. Owston's Japanese collectors.

This strongly differentiated species shows a probable relationship to both *N. tigrina* and *N. piscator*.

Cope's *Trimerodytes balteatus* (Proc. Acad. Nat. Sci. Phila., 1894, p. 426) probably represents an abnormal *Natrix*, which, however, cannot be identified with this species.

### ***Natrix stolata* (Linné).**

Linné, Syst. Nat., 1758, I, p. 219.

Stejneger, Herp. of Japan, 1907, pp. 280-283.

Two specimens, one from Ting an, Hainan, and one from Mt. Arizan, central Formosa; 19 scale rows in each.

### ***Pseudoxenodon stejnegeri* Barbour.**

Pl. VII, fig. 8.

Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, pp. 317-318.

Rostral just visible from above; internasals shorter than prefrontals; frontal almost one and one half times as long as broad, shorter than distance to tip of snout, much shorter than parietals; loreal as long as deep; two preoculars; three postoculars; temporals 2 + 2; eight upper labials, fourth and fifth entering orbit; five lower labials in contact with the anterior chin shields, which are very nearly the same size as the posterior. Eleven dorsal rows of scales keeled, only the dorsal five strongly; scales in nineteen rows anteriorly, in seventeen rows on middle of body, and in fifteen rows near the tail. Ventrals 153; anal divided; subcaudals in 68 pairs.

Color olive above, with an indistinct lateral series of dark blotches; head with a black stripe from the posterior border of the orbit to the angle of the jaws; upper labials with sharp black markings along their posterior

edges; upper lip yellowish. Lower surfaces dull white; confluent dark olive punctulations form three irregular bands, one along the middle and one on each end of the gastrosteges; there are many scattered spots elsewhere, also larger diffuse brown blotches. On the under surface of the tail the dots are irregularly scattered and produce a gray effect. Along the sides of the tail is a white line formed by spots on the outer end of each subcaudal scale. There are no spots on the throat, which is pure white. Length of body 370 mm.; length of tail 100 mm.

*Type*,— no. 7103, Mus. Comp. Zoöl., a single specimen, from Mt. Arizan, central Formosa, taken 29 November, 1906, by one of Mr. Owston's Japanese collectors.

This species seems to be related, as naturally would be expected, to *P. dorsalis* (Günther) from China. It differs in having two preoculars instead of one, in the number of ventral and subcaudal scales, and in coloration.

It was a privilege to associate with this interesting new species of a genus hitherto unrecorded from Formosa, the name of a kindly friend and generous helper, Dr. Leonhard Stejneger.

#### ***Enhydris plumbea* (Boie).**

Boie, Isis, 1827, p. 550.

Stejneger, Herp. of Japan, 1907, pp. 300–302.

Two typical examples from Ting an, Hainan, and one from Bankoro, central Formosa.

#### ***Elaphe quadrivirgata* (Boie).**

Boie, Isis, 1826, p. 209.

Stejneger, Herp. of Japan, 1907, pp. 327–333.

A single young specimen from Yokohama. A very common form.

#### ***Elaphe conspicillata* (Boie).**

Boie, Isis, 1826, p. 211.

Stejneger, Herp. of Japan, 1907, pp. 334–337.

After the long and excellent review of this species which Stejneger



has given, it only remains for me to mention briefly the fact that in the Owston collection came four specimens of this species. They are all typical examples and add nothing to the known range of the variation of this species. Two are from Mt. Fuji, one is from Yokohama, and one is from Hiuga, Kiushiu.

As Dr. Stejneger notes, this does not seem to be a very abundant form. It probably is confined to Japan, but it is possible that it occurs in the Russian Coast Province of the mainland.

Type locality: Japan. Probably the Kiusiu specimen mentioned above is an approximate toptype.

### **Liopeltis major** (Günther).

Günther, Cat. Colubrine Snakes Brit. Mus., 1858, p. 120.

Stejneger, Herp. of Japan, 1907, pp. 338-340.

Among the Formosan specimens received from Mr. Owston is a fine specimen of this species, which Dr. Stejneger kindly identified for me. It bears no definite locality other than Formosa, and it was taken during November, 1905. According to Stejneger (*l. c.*) six Formosan specimens are already known, four in the British Museum from the Swinhoe collection, and two in the Hong Kong City Hall Museum.

Type locality: Ningpo, China.

Range, according to Stejneger, lower Yangtse Valley, coasts of China from Hong Kong to Shanghai, and Formosa. In Fokien it has been found at an altitude of from 3000 to 4000 feet. Lately received here also from Ichang, Hupeh.

### **Holarchus formosanus** (Günther).

Günther, Ann. Mag. Nat. Hist., (4), IX, 1872, p. 20.

Stejneger, Herp. of Japan, 1907, pp. 354-356.

In the collection obtained from Mr. Owston were five specimens of this incompletely known snake. Two came from Mt. Arizan,

central Formosa, were typically colored, and had 161, 162 ventrals, and 51, 55 subcaudals.

Three specimens were from Hainan, two of them from Ting an, and one from Mt. Wuchi in the interior. These undoubtedly represent what Boettger considered a distinct species; they are however, apparently a well-defined local color variety, but nothing more. We may then call them

***Holarchus formosanus hainanensis* (Boettger).**

Boettger, Ber. Senckberg. Nat. Ges., 1894, p. 133, pl. iii, figs. 2 a-c.

The intricate head markings are indistinct compared to Formosan examples; the body is decidedly reddish, without a vertebral light line, and without the heavy dorsal blotches of a darker color. In this form there are only light zigzag lines or scattered spots of the dark color which on the sides of the Formosan individuals make large distinct markings.

The Ting an specimens have V. 167, 167; C. 58, 40. The lepidosis is the same as for specimens from Formosa. The Mt. Wuchi specimen has but seven supralabials on one side and V. 169, C. 45.

Type locality: Takao, Formosa.

This species is now known from a number of Formosan stations, as well as from Swatow and Fumun in Kwangtung, China.

Of this form Cope's *H. dolleyanus* (Proc. Acad. Nat. Sci. Phila., 1884, p. 423) must be considered a synonym. Boettger's paper (Ber. Senck. Nat. Ges., 1893-94) was received at the library of the Museum of Comparative Zoölogy, Oct. 16, 1894. Cope's paper did not appear until Feb. 13, 1895.

***Holarchus tæniatus* (Günther).**

Günther, Proc. Zoöl. Soc., 1861, p. 189.

Boulenger, Cat. Sn. Brit. Mus., II, 1894, pp. 227-228.

Six specimens of this species show no variation whatever in coloration from Günther's figure (Rept. Brit. Ind., p. 216, pl. xx,

fig. A). These are Mus. Comp. Zoöl., no. 5980, from Cochin China. This stability of coloration greatly contrasts with the condition in other members of the same genus.

Type locality: Cambodia.

This species is known from Siam and the Indo-Chinese Peninsula. Boettger (Ber. Senckberg. Nat. Ges., 1894, p. 134) makes this note, "Simotes quadrilineatus D. B.=S. taeniatus Günth." The authority for this synonymous name should read Jan (Nouv. Arch. Mus. Paris, 1866, Bull. p. 7; also Icon. Gén., 1865, Livr. 12, pl. iv, fig. 3). The explanation of the plates of Livraison 12 of Jan's Iconographie Général is by error a repetition of the explanation of the plates for Livraison 11, so that no details are given as to the history of the specimen figured.

### **Holarchus nesiotis** Barbour.

Plate VII, figs. 5, 6.

Barbour, Bull. Mus. Comp. Zoöl., Vol. 51, 1908, pp. 318-319.

Nasal divided; rostral reaching far back above, completely separating the internasals and coming into contact with the prefrontals. Frontal very large, much longer than distance to tip of snout, longer than the parietals. Loreal square; two pre- and two postoculars; temporals 1 + 2, the lower of the two temporals is the smaller, while the opposite is the condition in *H. formosanus* figured by Stejneger (Herp. of Japan, 1907, p. 355). Eight upper labials on each side, fourth and fifth entering eye; four labials in contact with anterior chin shield, which measures about one and one third the size of the posterior. Scales in 19 rows, perfectly smooth. Ventrals distinctly angulate, 169; anal divided; subcaudals 56 pairs.

Color pale brown above, with an indistinct light vertebral line and four dorsal and dorso-lateral longitudinal bands of slightly darker brown. Sides and belly ivory-white. There are dark brown spots on the parietals, also a symmetrical square brown, almost black, blotch below the eye on supralabials 5 and 6. A chevron-like band on the nape, with its apex directed forward.

*Type*,— no. 7107, Mus. Comp. Zoöl., a single specimen, about 355 mm. long, from Ting an, Hainan Island. Taken by a collector for Mr. Owston.

*Holarchus nesiotis* is related to *H. formosanus hainanensis* (Boettger).

**Dinodon orientale** (Hilgendorf).

Hilgendorf, Sitz.-ber. Ges. Nat. Fr. Berlin, 1880, p. 115, pl., figs. 1-5.  
Stejneger, Herp. of Japan, 1907, pp. 372-375.

A single typical adult from Yokohama. Sc. 17; V. 207; C. 75.  
Supralabials, 8-8; no pre-, 2 postoculars. Forty dark bands on  
body and fourteen on tail.

**Boiga multomaculata** (Boie).

Boie, Isis, 1827, p. 549.

Boulenger, Cat. Sn. Br. Mus., III, 1896, pp. 63-64.

A single specimen of this arboreal species comes from Ting an,  
Hainan; it has a formula as follows: Sc. 19; V. 208; C. 97.

**Hemibungarus japonicus** (Günther).

Günther, Ann. Mag. Nat. Hist., (4), I, 1868, p. 428, pl. xvii, fig. c.

Stejneger, Herp. of Japan, 1907, pp. 387-389.

A single specimen of this species from Amami Oshima, Riu Kiu  
Islands. The species still is known only from this one group of  
islands.

Type locality: Nagasaki. Stejneger has shown that the type  
almost certainly came from this Riu Kiuan group.

**Naia naia atra** (Cantor).

Cantor, Ann. Mag. Nat. Hist., IX, 1842, p. 482.

Stejneger, Herp. of Japan, 1907, pp. 394-397.

To this form a single specimen, from Ting an, Hainan, seems  
referable; its scales: 25/21; 173; 43. It is a young specimen,  
agreeing in color and squamation with Stejneger's description of a  
young Formosan example. It does differ, however, in having the

'white-rimmed spectacles' lying in a broad band of black, while the general ground color is olive green.

**Agkistrodon blomhoffii** (Boie).

Boie, Isis, 1826, p. 214.

Stejneger, Herp. of Japan, 1907, pp. 457-460.

Three specimens, one adult and two young, of the typical form of this species from Yokohama. For a full discussion of this form and its related subspecies, see Stejneger, *loc. cit.*

Type locality: Japan.

This snake has been divided into races by Stejneger. *A. blomhoffii* is confined to Japan proper. Subspecies *affinis* (Gray), *brevicaudus* Stej., and *intermedius* (Strauch), occur, respectively, in the southern Riu Kius, in eastern China, and in Korea and Formosa, the last-named ranging widely in southern Siberia, Tartary, Mongolia, and eastern Turkestan.

In the young specimens the characteristic yellow tip to the tail is conspicuous.

**Agkistrodon blomhoffii intermedius** (Strauch).

Strauch, Trudi Perv. Siezda Russkikh Yestestv., Zool. (p. 294); Mém. Acad. Sci. St. Pétersbourg, (7), XXI, 4, 1873, pp. 245, 282.

Stejneger, Herp. of Japan, 1907, pp. 464-465.

Two specimens which seem referable to this race have come from the vicinity of Mt. Taipaishiang, northern China. The fact that in both there are seven supralabials on each side, shows that in these specimens, as we might expect from the locality, there is a tendency toward the condition in *A. b. brevicaudus* Stej. The number of ventral scales is rather low for this form, viz. 157 and 161, while the single example which has a complete tail has 47 pairs of subcaudals, which is quite normal. There are 21 rows of scales on each, the most usual number being 23, though Stejneger knew of one speci-

men with 21 rows, as he did also one with 25. These came from Altai, Siberia. Stejneger's subspecies has been found in inland mountain ranges, further south, about Ichang, Ningpo, Chekiang, and Kiu Kiang; while this race has been known from an enormous belt to the northward.

Type locality: Government of Irkutsk.

### **Trimeresurus monticola** Günther.

Günther, Rept. Brit. Ind., 1864, p. 388, pl. xxiv, fig. B.  
Boulenger, Cat. Sn. Brit. Mus., III, 1896, pp. 548-549.

Stejneger (Herp. of Japan, 1907, p. 480) wrote at the end of his remarks on *T. okinavensis* that no near ally of this species was known from Formosa. He notes its relationship to *T. monticola*, and says, "the latter or a related form may be expected to occur in that island [Formosa]." It is interesting to record now how correct Stejneger's surmise was. A fine specimen from Tapposha, Mt. Arizan, central Formosa, was acquired with the Owston material. It is colored as Indian specimens are, but differs very slightly in having 10 scales separating the supraoculars and 10 supralabials. The scale rows are 27 in number, which Boulenger states is a rare condition. V. 155; anal entire; C. 46.

Type locality: Nepal and Sikkim.

Range: Himalayas, Tibet, Assam Hills, Upper Burma, Malay Peninsula, Sumatra; also Szechuen and Formosa.

### **Trimeresurus okinavensis** Boulenger.

Boulenger, Ann. Mag. Nat. Hist., (6), X, Oct., 1892, p. 302.  
Stejneger, Herp. of Japan, 1907, pp. 479-480.

It is interesting to record a specimen of this species from Amami Oshima, Riu Kiu Islands. Dr. Stejneger (*l. c.*) wrote, "The few specimens known of this species have nearly all come from Okinawa shima. According to a recent paper by Dr. Wall, the collector of

Mr. Owston's obtained not only four specimens in Okinawa shima, but also three in Amami Oshima, and one in Yaku shima. The latter occurrence is so extraordinary, however, that it would be well to await corroborative evidence, as some mistake in labelling may have occurred." The specimen before me was picked out, the only one which Mr. Owston had at the time, from a lot of specimens which seemed to have full data. It was taken 10 April, 1907, and thus cannot be one of the three examples mentioned above. There can now be no doubt whatever as to the species occurring on Amami Oshima. Unfortunately no corroborative evidence can be offered as to the validity of the Yaku shima record. The formula for this example follows: V. 129; anal entire; C. 42; interorbitals, 9; supralabials, 8. This is precisely the condition in Okinawa specimens. Variation within this form is very slight.

***Trimeresurus flavoviridis* (Hallowell).**

Hallowell, Proc. Acad. Nat. Sci. Phila., 1860, p. 492.

Stejneger, Herp. of Japan, 1907, pp. 475-478, pl. XXVII.

A truly formidable serpent, which reaches a length of nearly five and a half feet. This specimen was taken at Amami Oshima, Riu Kiu Islands, 19 September, 1904, by one of Mr. Owston's men. The interorbitals are 13 in number, and supralabials 9. V. 225; anal entire; C. 84. This formula is only approximate, as the specimen is slightly mutilated.

***Trimeresurus mucrosquamatus* (Cantor).**

Cantor, Proc. Zoöl. Soc., 1839, p. 32.

Stejneger, Herp. of Japan, 1907, pp. 467-470.

A single specimen from Bankoro, in the highlands of central Formosa. It differs slightly from the specimen which Stejneger described, in that there are 18 scales in a line between the supra-oculars. These latter are extremely narrow. There are also 10 supralabials, instead of 9. Ventrals 215; anal entire; subcaudals 88.

Type locality: Naga Hills, Assam.

Range: Very incompletely known; see Stejneger's discussion as to this snake's range and relationship with other allied forms.

***Trimeresurus gramineus*** (Shaw).

Shaw, Gen. Zoöl., III, pt. ii, p. 420.

Stejneger, Herp. of Japan, 1907, pp. 480-483.

Two specimens from Bankoro, central Formosa.

***Clemmys japonica*** (Temminck & Schlegel).

Temminck and Schlegel, Fauna Jap., Rept., 1835, p. 53.

Stejneger, Herp. of Japan, 1907, pp. 492-496, pl. XXIX.

A single typical example from the Yaeyama group, Riu Kius. It has never been reported from the locality, and was doubtless introduced from Japan — probably into some temple pond.

***Geoemyda spengleri*** (Gmelin).

Gmelin, Syst. Nat., I, 3, 1789, p. 1043.

Stejneger, Herp. of Japan, 1907, pp. 501-503, pls. XXXI, XXXII.

Three specimens of this interesting and rare turtle, two from Nago and the other from Nawa, both localities on Okinawa shima, Riu Kiu Islands.

***Cyclemys flavomarginata*** (Gray).

Gray, P. Z. S. Lond., 1863, p. 175.

Stejneger, Herp. of Japan, 1907, p. 503, pl. XXXIII.

An adult specimen from Ishigaki shima, Yaeyama group, Riu Kius. This is the only locality whence the species is known in the archipelago.



**Amyda sinensis** (Wiegmann).

Wiegmann, Nova Acta Ac. Leo. Car., XVII, 1834, p. 189.  
Stejneger, Herp. of Japan, 1907, pp. 524-526.

A single specimen from Kagi, Formosa.

**Amyda schlegelii** (Brandt).

Brandt, Mém. Biol. Acad. Sci. St. Pétersbourg, II, 1857, p. 610.  
Stejneger, Herp. of Japan, 1907, pp. 526-529.

One specimen from Antung, Manchuria.

EXPLANATION OF THE PLATES.

PLATE VI.

*Bufo bankorensis* Barbour.

- Fig. 1. Lower side, manus of male.
- Fig. 2. Lower side, manus of female.
- Fig. 3. Latero-dorsal view of male.

PLATE VII.

- Fig. 1-4. *Natrix aequifasciata* Barbour, both sides of heads of the two known specimens.
- Fig. 5. Lateral view, head of *Holarchus nesiotis* Barbour.
- Fig. 6. Dorsal view, head of *Holarchus nesiotis* Barbour.
- Fig. 7. Dorsal view of *Goniurosaurus hainanensis* Barbour.
- Fig. 8. Lateral view, head of *Pseudoxenodon stejnegeri* Barbour.